

IN THE CLAIMS:

1. - 4. (Cancelled)

5. An ion measuring composite electrode comprising:

an outer pipe having a closed distal end with a diameter of a portion adjacent the distal end narrower than a proximal end thereof;

an ion responsive section and a liquid connecting section is provided on the outer pipe;

5 and

an inner pipe is provided within the outer pipe and is spaced from the outer pipe by an elongated member with liquid absorption characteristics to form an annular space for providing a space for a reference liquid; the inner pipe is connected to the outer pipe to form the annular space.

6. The ion measuring composite electrode of Claim 5 wherein the elongated member is a string wound around the inner pipe.

7. The ion measuring composite electrode of Claim 6 wherein the outer pipe and inner pipe are glass that are connected together by welding.

8. The ion measuring composite electrode of Claim 6 wherein a cotton string is wound spirally around the inner pipe.

9. In an improved measuring instrument for measuring a liquid specimen, the improvement comprising:

a composite electrode including an inner pipe spaced by an elongated member wrapped around the inner pipe for offsetting a surrounding hollow outer pipe, the inner pipe is welded to
5 the outer pipe to provide an annular space between the inner and outer pipe for receiving a reference electrode liquid.

10. The improved measuring instrument of Claim 9 wherein the elongated member is a string having hydrophilicity for a reference electrode liquid.

11. The improved measuring instrument of Claim 10 wherein the elongated member is compressed between the inner pipe and the outer pipe to concentrically aligned respective axes of the inner pipe and outer pipe.

12. (New) An ion measuring composite electrode comprising:

an inner hollow glass pipe;

an outer hollow glass pipe having an inner surface cross sectional dimension greater than an outer surface cross sectional dimension of the inner hollow glass pipe, wherein the inner
5 hollow glass pipe is positioned within the outer hollow glass pipe;

a flexible material is positioned between the inner surface of the outer hollow glass pipe and the outer surface of the inner hollow glass pipe to space the inner hollow glass pipe from the outer hollow glass pipe, wherein the inner hollow glass pipe outer diameter is sealed to the inner diameter of the outer hollow glass pipe to form a reference electrode internal liquid space;

10 a liquid connecting section is provided adjacent one end of the outer hollow glass pipe to communicate with the sealed reference electrode internal space between the inner hollow glass pipe and the outer hollow glass pipe;

a reference electrode internal liquid is in the sealed reference electrode internal spacer;

a reference electrode communicates with the sealed reference electrode internal spacer;

15 a measuring electrode internal liquid is within the hollow inner glass pipe;

an internal electrode communicates with the inner hollow glass pipe; and

an ion responsive section is provided on the outer hollow glass pipe.

13. (New) The ion measuring composite electrode of Claim 12 wherein the flexible material is a water absorption material.

14. (New) The ion measuring composite electrode of Claim 13 wherein the flexible material is an elongated material wound around the inner hollow glass pipe.

15. (New) The ion measuring component electrode of Claim 14 wherein the flexible material is helically wound between the inner glass pipe and the outer hollow glass pipe.

16. (New) The ion measuring composite electrode of Claim 15 wherein the flexible material is adhered adjacent one end of the inner hollow glass pipe.

17. (New) The ion measuring composite electrode of Claim 16 wherein the inner hollow glass pipe is annularly welded at one end to the outer hollow glass pipe.

18. (New) The ion measuring composite electrode of Claim 12 wherein the outer hollow glass pipe has an enlarged inner diameter at one end and the inner glass pipe has an enlarged outer diameter positioned within the enlarged inner diameter.

19. (New) The ion measuring composite electrode of Claim 18 further including a first assembly cap attached to the outer hollow glass pipe and a second assembly cap mounted within the first assembly cap and attached to the inner hollow glass pipe.

20. (New) The ion measuring composite electrode of Claim 12 wherein the flexible material is selected from one of sponge, rubber and an elongated cotton string.

21. (New) The ion measuring composite electrode of Claim 20 wherein the cotton string is wound around an outer peripheral surface of the inner hollow glass pipe to both space the outer hollow glass pipe from the inner hollow glass pipe and to provide electrical conductivity in the presence of any bubble in the reference electrode internal liquid.

22. (New) An ion measuring composite electrode comprising:

an inner hollow glass pipe;

an outer hollow glass pipe having an inner surface cross sectional dimension greater than
5 an outer surface cross sectional dimension of the inner hollow glass pipe, wherein the inner
hollow glass pipe is positioned within the outer hollow glass pipe;

a water absorbing flexible material is positioned between the inner surface of the outer
hollow glass pipe and the outer surface of the inner hollow glass pipe to space the inner hollow
glass pipe from the outer hollow glass pipe, wherein the inner hollow glass pipe outer diameter is
10 sealed to the inner diameter of the outer hollow glass pipe to form a reference electrode internal
liquid space;

a liquid connecting section is provided adjacent one end of the outer hollow glass pipe to
communicate with the sealed reference electrode internal space between the inner hollow glass
pipe and the outer hollow glass pipe;

15 a reference electrode internal liquid is in the sealed reference electrode internal spacer;

a reference electrode communicates with the sealed reference electrode internal spacer;

a measuring electrode internal liquid is within the hollow inner glass pipe;

an internal electrode communicates with the inner hollow glass pipe; and

an ion responsive section is provided on the outer hollow glass pipe, wherein the outer
20 hollow glass pipe has an enlarged inner diameter at one end and the inner hollow glass pipe has
an enlarged outer diameter positioned with the enlarged inner diameter when compared to the
inner and outer diameter adjacent the ion responsive section.